

and details of boiler construction and design are discussed.

It is a matter for regret that from so good a book a certain number of errors could not have been eliminated. Thus, in speaking of the pitting of boiler plates below the surface of the water, the author states that in contact with the heated portion of the plate, the water gives up its dissolved air in contact with the surface of the metal, and that the bubbles there remain until large enough to rise, and he considers that during this period of rest the "nascent" oxygen which they contain will attack the iron. The idea that oxygen driven out of solution by the action of heat possesses the powers attributed to the nascent condition, will come as a surprise to his chemical readers. And again, on p. 61 it is stated that in the lungs the process of slow combustion is continually proceeding. In an age of specialism it is unlikely, and perhaps undesirable, that an author should speak with equal authority as engineer and physiologist. Reference to any modern text-book of physiology would have made clear the fact that diverse as may be the opinions as to the actual field of oxidation, the author appears solitary in selecting the lungs as the sphere of action.

The collection of formulæ put forward by various authorities for calculation of the calorific value of fuel from its chemical composition is very complete, but the author might have insisted more strongly than he has upon the errors inseparable from any such calculated heat values, which are due to our present ignorance of the molecular groupings in coal, and the thermal changes attending its formation.

An amazing confusion of idea is exhibited in the statement made on p. 69, "that gun-cotton ignites so readily that it could not be used for ammunition until it was discovered that the admixture of camphor or nitroglycerine raised this temperature." In the table of temperatures of ignition, on the same page, the ignition point of coal is given at 600° F.; this, on the evidence of recent experiments, is too low.

In the valuable chapter on heat transmission, no mention is made of one of the chief sources of loss in the passage of heat from the furnace to the water, namely, that the burning furnace gases are extinguished by contact with the comparatively cold surface of the plates, with the result that the flame never comes in contact with the metal, a layer of unburnt gas of very low conductivity existing between flame and plate; and this not only impedes the passage of heat to the water, but the gas creeping along the surface of the metal often escapes combustion, both in the furnace, combustion chambers, and tubes.

Coming to the engineering portion of the book, there is much which will excite comment from practical men. In the basic Bessemer steel process using phosphoric pig-iron, the purity of the blown metal is usually judged by the bath sample "fracture," which is quite as easy to gauge as a sample from the open-hearth working, and the procedure given in paragraph 6, p. 101, is at variance with every-day practice. Again, in describing the acid Siemens-Martin process, on p. 103, the author speaks of adding 25 per cent. scrap-iron, the ordinary practice being to charge steel scrap with the pig-iron before melt-

ing. In fact, scrap-iron could not be used in any quantity in this process, on account of the phosphorus and sulphur often contained in it; and it is the custom in most works to pick out all the iron found amongst the steel scrap for use in the Siemens-Martin furnace.

On p. 107 there is an excellent paragraph on cold bending, which contains valuable suggestions; but the remark that the bending of samples after annealing is valueless, may be objected to. The obvious reason of doing so is to bring the sample to the same condition as the finished article, and it is a common practice to specify that flange plates, or plates which have to be worked in any way, shall be annealed as a final process to bring them to a uniform condition; they may have been rolled at various temperatures, in which case the tensile and elongation tests would vary considerably. Nor will Mr. Stromeier's remarks upon drift tests meet with the general approbation of railway engineers. Surely, also, the first paragraph on p. 122, when considered in conjunction with the remarks on annealing made on p. 107, are of a contradictory nature?

The opinions expressed in the first paragraph of p. 156 are not justified by results of recent experiments, and the percentage of failures on the weld is not nearly so high as one would be led to expect from the experimental figures given on p. 157.

The tools described as being in use in boiler shops, on p. 182, are of an old-fashioned type, for special machines with three or more spindles capable of drilling up to 120 tube holes per day of nine hours, without any preparation of the plates, such as punching or drilling small holes, have been in use in most shops for a considerable period. The statement made on p. 237, that fitting a sufficient number of stay tubes will overcome the trouble consequent upon forced draught, is open to criticism, as it is not borne out by facts, and has indeed been the cause of considerable trouble in boilers.

It would have been better on the whole, considering the large number of books which now exist on design, to have curtailed the space devoted to this branch of the subject, which, although no doubt useful to the young draughtsman, might with advantage have been omitted from Mr. Stromeier's book.

These are minor and technical criticisms of an excellent work, exhibiting signs of much industry in compilation. The author is to be especially commended for his habit of reference on all occasions to the source of information.

OUR BOOK SHELF.

Chapters on Electricity. By Samuel Sheldon, Ph.D. (New York: Charles Collins, and the Baker and Taylor Co.)

IN the preface the author states that "these chapters on electricity, prepared for and included in the fourth revised edition of Olmsted's 'College Philosophy,' are here offered in a separate volume." The chapters deal in much the usual way with the stock work commonly found in elementary text-books on magnetism and electricity. The writing, however, appears to have been carefully done; the general style is clear and concise, but a little more explanation would, in many cases, have added to the clearness and, in a few cases, to the accuracy of the work.

In connection with Coulomb's law, the statement that $F = Q/r^2$ (Art. 581) is "strictly true only when the two bodies are in a vacuum," requires a little more elucidation than the author gives. Similarly the explanation of polarisation, the definition of specific resistance (in terms of the metre and square millimetre), the statement of Ohm's law, and the laws of thermo-electric phenomena require more detailed and accurate treatment.

The paragraphs on recent work, such as Hertz's experiments, theories of magnetism and electrolysis, and modern theories of the ether, are far too meagre to be of any service; they give no information even to the student who is able to read between the lines.

Apart from these points, the book appears to present a fairly reliable exposition of the elements of the subject, which may justify its issue as a separate volume.

Meteorology. By H. N. Dickson, F.R.S.E. (London: Methuen and Co., 1893.)

IN this little book the author has attempted to lay down "a certain amount of 'permanent way' specially adapted to practical purposes, but at the same time leading to the more theoretical grounds of modern research." The fundamental facts and principles stated in the earlier chapters furnish the inquirer with much of the necessary stock-in-trade of information culled from other branches of science; as, for example, the behaviour of gases under varying conditions of temperature and pressure. Cyclones and anticyclones receive somewhat detailed consideration, but the account is very intelligible, and the mathematical expressions are of the simplest character. The present position of meteorology in regard to weather-forecasting is very clearly and impartially stated. In the chapter on instruments the author leaves a little to be desired in the shape of illustrations and descriptions, especially as he aims at producing a practical treatise. An excellent account of cloud classification is given. The relation of meteorology to agriculture is a subject of great practical importance, and this is carefully discussed in the final chapter.

The author has availed himself of all the most recent sources of information, both British and foreign, and the references to original papers form a valuable feature of the book. To all who desire to carry their meteorological observations beyond the mere hobby stage, we heartily commend this little book.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Great Auk's Egg.

IMAGINATION has long had a large share in the accounts given of the Gare-fowl or Great Auk, notwithstanding the efforts of those who have tried to set forth nothing but the truth on the subject, yet I do not call to mind meeting with so "many inventions" regarding it as have appeared in the newspapers within the last week, on the occasion of the recent sale of a specimen of the egg of that bird. I should occupy too much space were I to dwell upon them; but I would ask for the admission of a few lines in which to state what is known exactly of the origin of that specimen, which I well remember in the collection of the late Mr. Yarrell. He told me, as he told others of his friends, that he bought it in Paris; and, to the best of my belief, not many years after the peace of 1815. In a little curiosity-shop of mean appearance, he saw a number of eggs hanging on a string; he recognised one of them as an egg of *Alca impennis*, and asking their price was told that they were one franc apiece, except the large one, which from its size was worth two francs. He paid the money and walked away with the egg in his hat. That is the whole story on which so im-

posing an edifice has been built, and the only "variant" of it deserving of consideration is to the effect that the price of the big egg was five instead of two francs. I may add that this simple story was published by the late owner of the egg, the Baron Louis d'Hamonville, in the *Bulletin* of the French Zoological Society for 1891 (tome xvi. p. 34).

ALFRED NEWTON.

Magdalene College, Cambridge, February 24.

Frost-Cracks and "Fossils."

SEVERAL letters appeared in NATURE last winter describing some of the more interesting plant-like forms due to frost acting on various surfaces, and both Prof. Meldola and myself drew attention to the possible deceptions which might arise from a preservation of such patterns as fossils. I yesterday met with a striking case illustrating this. It was at Cullercoats, on the Northumberland coast. There had been a slight frost the night before, and the surface of a talus of semi-liquid mud at the foot of a low cliff of boulder clay (actually on the line of the great Fault known as the "Ninety-Fathom Dyke") was found to be indented with cracks about $\frac{1}{4}$ to $\frac{1}{2}$ an inch deep and $\frac{1}{4}$ of an inch in breadth. These cracks were disposed in beautifully branched patterns bearing a surprising resemblance, in outline, to some of the more subdivided sea-weed fronds. A sandy beach lay close by, and a high wind was blowing the sand on to the mud. It was obvious that the sand would soon fill in the frost-cracks under these conditions. The cracks would thus be preserved, and if at any future time the mud surface be again exposed it will be found covered with sand (or, after induration of the mud and pressure of overlying material, sandstone) casts of what it would be very difficult to believe were not vegetable organisms in an unusually perfect state of preservation.

Newcastle-on-Tyne, February 25.

G. A. LEBOUR.

The Origin of Lake Basins.

I WISH to draw the attention of your correspondents, Messrs. Aitken and Tarr, to p. 94 of the *Geological Magazine*, vol. iv. 1876, in regard to the manner in which, in all probability, the greater number of the lakes in British North America were formed. There are, however, doubtless many other causes by which lake basins have been formed. The object of my notice was simply to point out that the ice need not be supposed to have exerted any extraordinary or abnormal influence in scooping out rock basins which have subsequently become lakes.

Ottawa, February 16.

ALFRED R. C. SELWYN.

Note on the Habits of a Jamaican Spider.

OBSERVING in your issue of January 11, p. 253, an interesting note on the *Nephila madagascariensis*, I am prompted to send you some unpublished observations on the Jamaican species, *N. clavipes*. They are from the MSS. of the late Mr. William Jones (concerning whom see *Journ. Inst. Jamaica*, 1893, p. 301), and date from over fifty years ago. The record begins: "*Aranea clavipes*, or the great yellowish wood-spider. I fancy Sir Hans Sloane must have been misinformed when he states that this spider's web will not only stop small birds but even pigeons. I will venture to assert that its strength would not even endure the struggling of the smallest humming-bird." But below is another entry: "Dec. 25, 1839. I wronged the accuracy of Sir H. Sloane's statement; a little boy returning from an errand brought me a little black and yellow bird that he found entangled in a web of *A. clavipes*." After this he adds a more general statement concerning the spider: "St. Thos. ye East, on bushes and outhouses,—I found in the old cooper's shop at Slamans Valley Est. in Portland, many hundreds of these, some of a monstrous size. These spiders weave an almost large (*sic*) spiral web, yellow and strong, like silk, glutinous or viscid, and well adapted for arresting the flight of large insects. I have frequently seen some of their lines two or three yards long. Butterflies appear their favourite food. They form an oblong oval cocoon of a white substance like soft chamois leather, outside composed of little round-shaped compartments; the cocoon is covered over with a mesh of strong yellow thread or silk." Finally he gives a technical description of the spider, which need not be quoted. The spider's size is said to be 1 to 1½ inches in length, with the fore-legs 2½ inches long, the second pair 2 inches, the third pair 1 inch, and the fourth pair 2 inches.